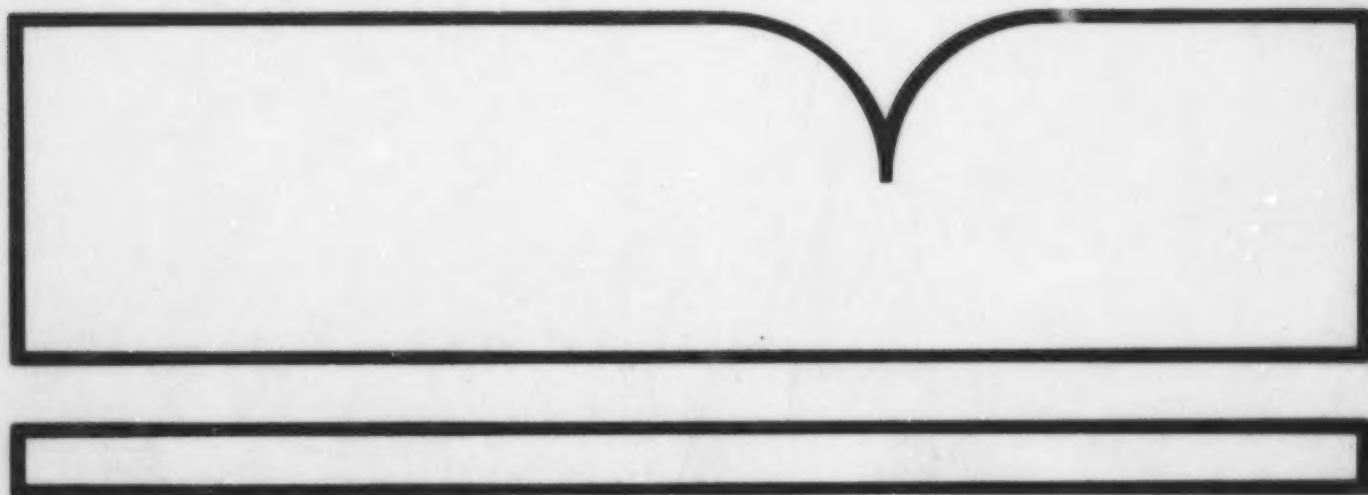


Pesticide Fact Sheet Number 25: Carbophenothion

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Pesticide Fact Sheet

Name of Chemical: CARBOPHENOTHION

Reason for Issuance:

Date Issued: June 30, 1984

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1. DESCRIPTION OF CHEMICAL

Chemical Name: S-[[[p-chlorophenyl)thio]methyl]
O,O-diethyl phosphorodithioate

Common Name: Carbophenothion

Trade Name: Trithion[®]

EPA Shaughnessy code: 058102

Chemical Abstracts Service (CAS) Number: 786-19-6

Pesticide Type: Insecticide and Acaricide

Chemical family: Organophosphate

U.S. and foreign producers: Stauffer Chemical Co.

2. USE PATTERNS AND FORMULATIONS

- Registered for use on a wide variety of vegetable, fruit, nut, forage, ornamental, and forestry sites.
- Majority of pesticide use is on citrus.
- Commercially available as dust, granular, pelleted, wettable powder, and emulsifiable concentrate formulations.
- Applied as foliar applications using either ground or aerial equipment. Dormant and delayed dormant applications are made to some fruit and nut trees. There are also limited uses as a seed treatment, dip, and soil insecticide.
- See also EPA Index Entry for carbophenothion.

3. SCIENCE FINDINGS

Carbophenothion has data gaps in areas of toxicology, environmental fate, and ecological effects. A summary of the science findings based on the available data is provided below:

Chemical Characteristics

Physical State: Liquid

Odor: Mild mercaptan

Color: Yellow-brown

Empirical formula: C₁₁H₁₆ClO₂PS₃

Molecular weight: 342.9

Vapor pressure 0.008 at 25°C
solubility in water: 0.34 ppm at 20°C
specific gravity: 1.274 at 20°C
pH: 2.43
boiling point: 82°C at 0.01 mmHg
miscibility: miscible with most organic solvents such as petroleum ether, benzene, toluene, xylene, ethers, alcohol and ketones.

TOXICOLOGY

Acute Oral Toxicity: 0.02 ml/kg in male rats

Reproduction: A rat three year generation study had a NOEL of 10 ppm

Acute Delayed Neurotoxicity: not neurotoxic at 330 mg/kg

2-Year Dog Feeding Study: NOEL of 5 ppm

Adequate studies are unavailable to assess the acute toxicological effects of carbophenothion. Preliminary data indicate that carbophenothion is in Toxicity Category I on the basis of acute oral effects. Carbophenothion is a cholinesterase inhibitor. It is not adequately tested for acute toxicology, chronic toxicity, oncogenicity or teratology.

ECOLOGICAL EFFECTS

Freshwater Fish Acute Toxicity

Coldwater fish: rainbow trout - 56 ppb

Warmwater fish: bluegill sunfish - 13 ppb

Avian Acute Oral Toxicity

Bobwhite quail - 320 mg/kg

Acute Toxicity to Freshwater Invertebrates

adult Palaemonetes - 1.2 ppb

Acute Toxicity to Marine and Estuarine Organisms

pink shrimp - 0.47 ppb

sheepshead minnow - 17 ppb

Chronic Toxicity for Marine and Estuarine Organisms

grass shrimp life cycle study - Maximum Acceptable Theoretical

Concentration (MATC) - $>0.22 < 0.36$ ppb

sheepshead minnow embryo/juvenile study - MATC $>1.3 < 2.8$ ppb

Carbophenothion is characterized as very highly toxic to freshwater and marine/estuarine organisms and highly toxic to upland gamebirds. See discussion under Section 4 [Summary of Regulatory Position and Rationale].

ENVIRONMENTAL CHEMISTRY

Available data are insufficient to assess the environmental fate of carbophenothion or to assess the potential exposure of humans and non-target

organisms to carbophenothion. Preliminary data indicate that carbophenothion is relatively immobile in sandy loam soils. However, The Agency cannot more completely assess the potential for carbophenothion to contaminate groundwater until data are submitted. Preliminary data indicate that there may be a potential for carbophenothion to accumulate in spot and juvenile sheepshead minnows.

TOLERANCE REASSESSMENT

Tolerances for combined residues of the insecticide carbophenothion (S-[p-chlorophenylthio)methyl] O,O-diethyl phosphorodithioate) and its cholinesterase-inhibiting metabolites in or on raw agricultural commodities are established as follows:

10 parts per million in or on almond hulls.
5 parts per million in or on alfalfa (fresh), alfalfa (hay), bean straw, clover, (fresh), clover (hay), corn forage, sorghum forage, sugarbeets (roots), sugarbeets (tops).
4 parts per million in or on blueberries.
2 parts per million in or on grapefruit, lemons, limes, oranges, sorghum grain, tangerines.
0.8 part per million in or on apples; apricots; beans, snap (succulent form); beans, lima (succulent form); beets, garden (roots); beets, garden (tops); cantaloups; cherries; crabapples; cucumbers; eggplants; figs; grapes; nectarines; olives; onions (dry bulb); onions (green); peaches; pears; peas (succulent form); peppers; pimentos; plums (fresh prunes); quinces; soybeans (succulent form); spinach; strawberries; summer squash; tomatoes; watermelons.
0.2 part per million in or on corn (kernels plus cob with husks removed), undelinted cottonseed.
0.1 part per million in the fat of meat of cattle, goats, hogs and sheep.
0.1 part per million (negligible residue) in or on beans (dry) pecans, and walnuts.
Zero in milk.

The tolerances are published in 40 CFR 180.156. Tolerances for numerous raw agricultural commodities as well as processed products are not supported by available data.

No new crop groupings can be established at this time because of extensive residue chemistry data gaps. Compatibility between Codex MRL's and U.S. tolerances will be assessed when data gaps specified in Table A have been submitted and evaluated.

The Acceptable Daily Intake (ADI) for carbophenothion is 0.0125 mg/kg/day. This is based on an acceptable dog chronic feeding study with a No Observable Effect Level (NOEL) of 5.0 ppm and a safety factor of 10.

The Theoretical Maximum Residue Contribution (TMRC), based on relevant food factors and the tolerances cited in 21 CFR 193.50 and 40 CFR 180.156, is 0.5806 mg/day assuming a 1.5 kg diet. Accordingly, the percentage of

the ADI used up is 77.42%.

4. SUMMARY OF REGULATORY POSITION AND RATIONALE

The Agency has identified concerns over the potential adverse effects of carbophenothion to aquatic and terrestrial species. Based on acceptable aquatic acute toxicity studies, it is calculated that the expected concentration of carbophenothion following direct application to a 6-inch layer of water exceed 1/2 the acute toxicity level in aquatic species. Based on a scientifically sound subacute dietary study, it is calculated that the expected residues in avian foodstuffs following a single application of carbophenothion at a rate of 1 pound a.i. per acre exceed 1/5 the subacute dietary toxicity in avian species. In addition, although there is insufficient information on the granular formulations, the Agency expects that granular applications of carbophenothion would have an adverse impact on birds.

A total risk assessment cannot be made until gaps in the data base for terrestrial species and environmental fate are filled.

The Agency is unable to complete a full tolerance reassessment of carbophenothion because of extensive residue chemistry and toxicology data gaps. Future requests for tolerances will not be automatically rejected, but will be considered on a case-by-case basis.

California has established reentry intervals for carbophenothion of 14 days for citrus, peaches, nectarines, and grapes; and 2 days for all the other crops. A federal reentry interval of 2 days for carbophenothion has been established for all crops under 40 CFR 170. The Agency is now requiring 2 days for all crop uses of carbophenothion on an interim basis, and is requesting data for establishing permanent reentry interval(s). The Agency is also requiring an interim 24 hour reentry interval for the domestic outdoor usage on home lawns and ornamentals and requesting data to enable the Agency to make a risk assessment.

The Agency has determined that all products warrant restricted-use classification based on acute dermal toxicity. Registrants have the option of placing the restricted-use classification on the labeling, or submitting acute toxicity data to the Agency.

5. SUMMARY OF MAJOR DATA GAPS

158.130 Environmental fate

- 161-1 - Hydrolysis
- 161-2 - Photodegradation In Water
- 161-3 - Photodegradation On Soil

- 161-4 - Photodegradation In Air
- 162-1 - Aerobic Soil Metabolism Study
- 162-2 - Anaerobic Soil Metabolism Study
- 162-3 - Anaerobic Aquatic Metabolism Study
- 163-1 - Leaching and Adsorption/Desorption Mobility Studies
- 163-2 - Volatility (Lab) Mobility Studies
- 163-3 - Volatility (Field) Mobility Studies
- 164-1 - Soil Dissipation Studies
- 164-3 - Forestry Dissipation Studies
- 164-5 - Soil, Long-Term Dissipation Studies
- 165-1 - Rotational Crops Accumulation Studies (confined)
- 165-2 - Rotational Crops Accumulation Studies (Field)
- 165-4 - In Fish Accumulation Studies
- 165-4 - In Aquatic Non-Target Organisms Accumulation Studies

154.140 Reentry Protection

158.135 Toxicology

- 82-1 - 90-Day Subchronic Feeding - Rodent
- 83-1 - Chronic Toxicity - Rodent (rat)
- 83-2 - Oncogenicity - rat and mouse
- 83-3 - Teratogenicity - 2 species
- 84-2 - Gene Mutation
- 83-2 - Chromosomal Aberration
- 83-2 - Other Mechanisms of Mutagenicity

158.145 Wildlife and Aquatic Organisms

- 71-1 - Avian Acute Oral Toxicity
- 71-2 - Avian Subacute Dietary Toxicity
- 72-2 - Acute Toxicity To Freshwater Invertebrates

158.125 Residue Chemistry

see under Tolerance Reassessment

6. Contact person at EPA

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